REMARKS

The Examiner is thanked for the careful examination of the application, and for the courtesy of the interview granted Applicant's attorney on January 31, 2008. The arguments raised at the interview are set forth herein.

The Examiner is reminded that the present application has been granted special status. Accordingly, Applicant respectfully requests that the Examiner telephone the undersigned attorney in order to expedite prosecution of the application in the event that any further issues arise.

With respect to the double patenting rejection, the Examiner is respectfully requested to hold the rejection in abeyance until the other rejections have been resolved.

Art Rejections:

Claims 1 – 18, 27 – 32, and 35 are cancelled. Applicant reserves the right to file one or more continuation applications directed to the cancelled claims.

Claims 19 – 26, 33, and 34 have been rejected under 35 U.S.C. §103(a) as being allegedly anticipated by U.S. Patent No. 6,395,096, hereinafter *Madanshetty*, in view of other secondary references.

Claim 19, as now amended, defines, among other elements, an ultrasonic treatment method comprising disposing at least a portion of a living terrestrial animal or human in aerated water; and thereafter ultrasonically generating stable vibrating bubbles in the aerated water; using a sensor to determine the presence of transient or inertial cavitation in the tank. The generating of said stable vibrating bubbles includes energizing a transducer with periods of full-wave compression and

rarefaction cycles alternating with periods of rectified-wave compression pressure cycles sufficient to suppress inertial or transient cavitation for a predetermined interval; and using a signal from the sensor to determine a percentage or proportion of rectification of said electrical signal to obviate or avoid inertial or transient cavitation.

As explained at the interview, *Madanshetty* does not teach or suggest using a partially rectified electrical signal. In the Office Action, the Examiner referred to Figure 3 of *Madanshetty* as an alleged example of a partially rectified signal. However, Figure 3 illustrates a square wave signal having a duty cycle wherein the signal is off during predetermined periods. Applicant submits that the wave signal illustrated in Figure 3 does not include a partially rectified signal.

As set forth in the published application, the present invention uses the partially rectified signal in order to ***avoid*** inertial or transient cavitation. See paragraph [0030] of the published application, wherein it explains that a microprocessor is operatively coupled to the signal generator and the tank for determining a percentage or proportion of rectification of the electrical signal to obviate or avoid inertial or transient cavitation. In paragraph [0031], the application distinguishes over the type of signal illustrated in *Madenshetty*. "Thus, the present invention provides an iterative, continuous full wave to half wave pressure amplitude control rather than the current practice of lowering acoustic intensity or employing *on/off pulsed* ultrasound, or lowering acoustic intensity."

The primary difference between the signal in *Madenshetty* and that of the partially rectified signal of the present invention is that the *Madenshetty* signal is substantially equal on both sides of the abscissa. Thus, the bubbles will continue to

expand until they exceed their critical radius, at which point they will implode. See paragraph [0008] of the present application, wherein it explains that with substantially equal expansion (rarification) and compression cycles (i.e., equal signals on both sides of the abscissa), the surface area of a bubble produced by ultrasound pressure is slightly greater during rarification than in compression cycles. Since the amount of gas that diffuses in or out of the bubble depends on the bubble surface area and skin thickness, diffusion into the bubble during rarification cycles will be slightly greater than diffusion out during compression cycles. Thus, for each cycle of sound, the bubble expands a little more than it shrinks. In paragraphs [0007] and [0009] of the present application, it is explained how when the bubble reaches a critical radius, ***transient cavitation*** will occur with the bubble collapsing.

Thus, *Madanshetty* is ***intended to induce transient cavitation***. See, e.g., column 10, lines 39-42, "As indicated above, it is preferable to induce *transient cavitation* with newly formed bubbles in order to obtain a more intense and vigorous release of energy during implosion." In fact, *Madanshetty* defines cavitation as the formation of cavities or bubbles in a liquid where the ensuing bubble dynamics and energy concentration *result in implosive collapse of bubbles* that achieve unique and surprising results. See column 1, lines 50 – 54. Thus, *Madanshetty* teaches away from the present invention.

Because of the use of rectified signals, there is prolonged compression of the bubble during the period of time when the signal is rectified. Accordingly, during that period, the bubbles are compressed so that they are smaller than their resonant size at the applied frequency, thereby prolonging stable cavitation. See paragraph [0071] of the present application. Accordingly, Applicant submits that *Madenshetty* clearly

does not teach a partially rectified signal. Furthermore, Applicant submits that the difference is significant in that because of the duty cycle signal disclosed by *Madanshetty*, the bubbles will continue to grow until they collapse in view of the fact that for each cycle of sound, the bubble expands a little bit more than it shrinks.

Accordingly, the signal in *Madanshetty* is not only not a "partially rectified" signal, it functions differently, and achieves a different result. Accordingly, Applicant submits that claim 19, which requires rectified wave compression cycles is not taught or suggested by *Madanshetty*, or any of the secondary references, with the exception of *Fujimoto*, which is discussed hereinafter. Accordingly, the rejection based on *Madanshetty* should be withdrawn.

Concerning U.S. Patent No. 5,694,936, hereinafter *Fujimoto,* there was discussion about the signal illustrated in Figure 8 of *Fujimoto*. However, as pointed out at the interview, *Fujimoto* teaches that the signal of Figure 8 causes catastrophic cavitation, and thus teaches away from the preset invention, which now recites, energizing a transducer with periods of full-wave compression and rarefaction cycles alternating with periods of rectified-wave compression pressure cycles ***sufficient to suppress*** inertial or transient cavitation for a predetermined interval.

Because of RMD, *Fujimoto* ends up with a finite size bubble at the intersection of the T left hand ordinate, not no bubble, as illustrated. Again, at the intersection of the 0-0 ordinate and the end of the first rectified pulse *Fujimoto* ends up with a smaller bubble which through the second negative pulse grows to a larger size bubble than the bubble developed by the negative pulse on the left of the T left hand ordinate. The bubble developed by the third negative pulse is larger than the bubble at developed at the intersection of the T left hand ordinate. Hence, in time, the

bubble will, under rectified mass diffusion (RMD) influence, reach applied resonant frequency size whereupon the bubble will experience transient bubble collapse.

Fujimoto's expectation, at column 7, lines 8-12, is that cavitation grown at particular pressure amplitude is destroyed by a pressure opposite to that on growth. However, technically it is not so simple.

Accordingly, Applicant submits that the foregoing claims, as now amended, are clearly patentable over the applied prior art.

Accordingly, in view of the foregoing amendments and remarks, the Examiner is respectfully requested to reconsider and withdraw the outstanding rejections. In the event that there are any questions concerning this response, or the application in general, the Examiner is encouraged to telephone the undersigned attorney.

Respectfully submitted,

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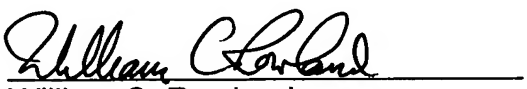
Date: February 19, 2008

By: 
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